HPPSC

Previous Year Paper
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1. For stability and economic reasons we operate the transmission lines with power angle in the range.....

(A) 10° to 25°
(B) 30° to 45°
(C) 60° to 75°
(D) 65° to 80°

2. For lumped inductive load, with the increase in frequency.....

(A) P and Q increase
(B) P increases, Q decreases
(C) P decreases, Q increases
(D) P and Q decrease

3. Ferranti effect on long overhead lines is experienced when it is.....

(A) Lightly loaded
(B) On full load at unity power factor
(C) On full load at 0.8 p.f. lag
(D) In all these cases

4. Stringing chart is useful for.....

(A) Finding the sag in conductor
(B) Designing of tower
(C) Designing of the insulator string
(D) Finding the distance between the towers

5. The Buchholz relay protects a transformer from.....

(A) All types of faults
(B) A turn to turn fault
(C) Winding to winding fault
(D) None of these

6. A voltage controlled bus is treated as a load bus in subsequent iteration when its.....

(A) Voltage limit is violated
(B) Active power limit is violated
(C) Reactive power is violated
(D) Phase angle limit is violated

7. The load flow solution is always assured in case of.....

(A) Newton-Raphson method
(B) Gauss method
(C) Gauss-Seidel method
(D) None of these methods

8. Sheath are used in cables to.....

(A) Provide proper insulation
(B) Provide mechanical strength
(C) Prevent ingress of moisture
(D) None of these

9. The corona loss on a particular system at 50 Hz is 1 kW/phase per km. The corona loss on the same system with supply frequency of 25 Hz will be.....

(A) 1 kW/phase/km
(B) 0.5 kW/phase/km
(C) 0.667 kW/phase/km
(D) 2 kW/phase/km

10. The insulation resistance of a cable of length 5 km is 2 MΩ, its insulation resistance for 40 km length will be :

(A) 1 MΩ
(B) 5 MΩ
(C) 0.25 MΩ
(D) 16 MΩ

11. For load flow solution the quantities specified at a load bus are.....

(A) P and Q
(B) P and |V|
(C) Q and |V|
(D) P and δ

12. If the power transferred from a system to a load under maximum power transfer condition is P_m, the loss in the system is.....

(A) P_m
(B) $P_m/2$
(C) $2\ P_m$
(D) None of these

13. A voltmeter gives 120 oscillations per minute when connected to the rotor. The stator frequency is 50 Hz. The slip of the motor is.....

(A) 2%
(B) 4%
(C) 5%
(D) 2.5%

14. Load flow study is carried out for.....

(A) Fault calculation
(B) Stability analysis
(C) System planning
(D) Load frequency control

15. When two transformers of different kVA ratings are connected in parallel, they share the load in proportion to their respective kVA ratings only when their.....

(A) kVA ratings are identical
(B) Efficiencies are equal
(C) Per unit impedances are equal
(D) Equivalent impedances are equal

16. If a transformer is switched on to a voltage more than the rated voltage for a certain loading condition and lagging power factor, then.....

(A) Its power factor will improve
(B) Its power factor will deteriorate
(C) No effect on power factor
(D) It may or may not improve

17. The standard current ratings of an electromagnetic relay are.....

(A) 5 A and 15 A
(B) 15 A and 20 A
(C) 1 A and 5 A
(D) None of these

18. The efficiency of a power transformer under short-circuit test conditions is approximately.....

(A) 10%
(B) 100%
(C) 50%
(D) zero %

19. The voltage and current in a circuit are given by

$$v = 10 \sin (\omega t - \pi/6)$$

$$i = 10 \sin (\omega t + \pi/6)$$

The real power consumed is given as.....

(A) 100 W
(B) 50 W
(C) 86.6 W
(D) 25 W

20. In a circuit voltage and current are given by :

$$V = (10 + j5) \text{ volts and } I = (6 + j4) \text{ Amps}$$

The circuit is.....

(A) Inductive
(B) Capacitive
(C) Resistive
(D) May be any of these

21. The most appropriate operating speeds in rpm of generators used in thermal, nuclear and hydro stations would respectively be.....

(A) 3000, 300 and 1500
(B) 3000, 3000 and 300
(C) 1500, 1500 and 3000
(D) 1000, 900 and 750

22. Transmission lines are transposed to.....

(A) Reduce the copper loss
(B) Reduce skin effect
(C) Prevent interference with neighbouring telephone lines
(D) Prevent short-circuit between any two lines

23. A single-phase transmission line of impedance j0.8 ohm supplies a resistive load of 500 A at 300 V. The sending end power factor is.....

(A) Unity
(B) 0.8 lagging
(C) 0.8 leading
(D) 0.6 lagging

24. The reflection coefficient of a short-circuited line for voltage is.....

(A) –1
(B) +1
(C) 0.5
(D) Zero

25. Which of the following are the advantages of interconnected operation of power systems ?

(*i*) Less reserve capacity requirement
(*ii*) More reliability
(*iii*) High power factor
(*iv*) Reduction in short-circuit level

Select the *correct* answer using the codes given below :

(A) (*i*) and (*ii*)
(B) (*ii*) and (*iii*)
(C) (*iii*) and (*iv*)
(D) (*i*) and (*iv*)

26. In a power system, each bus or node is associated with four quantities, namely :

(*i*) Real power
(*ii*) Reactive power
(*iii*) Bus voltage magnitude
(*iv*) phase angle of the bus voltage

For load flow solution, among these four, the number of quantities to be specified is.....

(A) Any one
(B) Any two
(C) Any three
(D) All the four

27. Using bundled conductors results in.....

(A) Reduced reactance
(B) Reduced corona loss
(C) Increased voltage gradient
(D) Both (A) and (B)

28. The reactance relay is essentially.....

(A) An over-voltage relay with current restraint

(B) An over-voltage relay with directional restraint

(C) A directional relay with voltage restraint

(D) A directional relay with current restraint

29. Severe over-voltages are produced during arcing faults in a power system with neutral.....

(A) Isolated (B) Solidly earthed

(C) Earthed through a resistance (D) earthed through an inductive coil

30. In terms of plant powers P_n and P_m and loss coefficients B_{mn} the total transmission loss P_L is :

(A) $\sum_{m=1}^{N}\sum_{n=1}^{N} B_{mn} P_n$ (B) $\sum_{m=1}^{N}\sum_{n=1}^{N} P_m B_{mn}$

(C) $\sum_{m=1}^{N}\sum_{n=1}^{N} P_m B_{mn} P_n$ (D) $\sum_{m=1}^{N}\sum_{n=1}^{N} 2P_m B_{mn}$

31. In load flow analysis, the load at a bus is represented as.....

(A) A constant current drawn from the bus

(B) A constant impedance connected at a bus

(C) Constant real and reactive power drawn from the bus

(D) A voltage-dependant impedance at the bus

32. Which method/s can be used for the measurement of three-phase power for an unbalanced load ?

(A) Three voltmeter method

(B) Two voltmeters and one ammeter method

(C) Two watt meters method

(D) None of the above

33. The annual cost characteristics of plants are given as :

(a) $C_1 = 5kW_1 + 0.02$ kWhr

(b) $C_2 = 7kW_2 + 0.015$ kWhr

Which plant can be selected for base load operation ?

(A) Plant 1 (B) Plant 2

(C) Any of these (D) None of these

34. The main criterion for the design of a distributor is.....

(A) The voltage drop (B) Corona loss

(C) Temperature rise (D) Radio interference

35. Ash content of Indian coal is approximately.....

(A) 5% (B) 8%

(C) 10% (D) 25%

36. The pH value of water used for boiler is.....

(A) Unity (B) 7

(C) 10 (D) Slightly more than 7

37. A Kaplan turbine is a.....

(A) Inward flow, impulse turbine

(B) Outward flow, reaction turbine

(C) High head, mixed flow turbine

(D) Low head, axial flow turbine

38. Which one of the following lamps gives nearly monochromatic light ?

(A) Fluorescent tube (B) Sodium vapour lamp

(C) Mercury vapour lamp (D) GLS lamp

39. For welding aluminium alloys, the method used is.....

(A) Tungsten arc welding
(B) Acetylene oxygen gas welding
(C) D.C. arc welding
(D) A.C. arc welding

40. It is desirable to operate the arc furnace at.....

(A) Unity power factor
(B) 0.707 lag power factor
(C) 0.8 lead power factor
(D) 0.5 lead power factor

41. Hydrogen cooling is used for large size.....

(A) Turbo alternators only
(B) Water wheel generators
(C) Both types of generators
(D) None of these

42. Induced draft fans are located at.....

(A) The top
(B) The bottom
(C) In the middle part
(D) Can be anywhere

43. The fertile material is.....

(A) U_{235}
(B) U_{233}
(C) Plutonium
(D) U_{238}

44. The core type furnace is usually operated at.....

(A) 10 Hz
(B) 50 Hz
(C) 500 Hz
(D) 5 kHz

45. Carbon arc welding is suitable particularly for.....

(A) Ferrous metals
(B) Non-ferrous metals
(C) All metals
(D) None of these

46. In control system engineering the term servomechanism is used for systems where the output is.....

(A) Position
(B) Velocity
(C) Acceleration
(D) Any of these

47. The linearized model of $y = x^3$ around $x = 2$ is.....

(A) $y = (x - 2)$

(B) $y - 8 = 12\ (x - 2)$

(C) $y = 12\ (x - 2)$

(D) $y - 8 = (x - 2)$

48. When the input to a system was withdrawn at $t = 0$, its output was found to decrease exponentially from 1000 units to 500 units in 1.386 seconds. The time constant of the system is.....

(A) 0.500

(B) 0.693

(C) 1.386

(D) 2.00

49. The sensitivity of gyro can be increased by :

(A) Increasing the mass of wheel

(B) Increasing spin velocity

(C) Reducing the spring stiffness

(D) Both (B) and (C)

50. If a positive feedback path is added to an open-loop control system, then its.....

(A) Loop gain may increase

(B) Stability is improved

(C) Stability may deteriorate

(D) Both (A) and (C)

51. The reason/s for the steady state error in the control system is/are.....

(A) Friction

(B) Non-linearity

(C) Type of system

(D) All of these

52. The derivative control action alone cannot be used because.....

(A) There is no control element available which can implement the derivative control action alone

(B) It is effective during transient period

(C) The steady state error increases beyond limit when derivative control is used alone

(D) The net effective damping decreases considerably when derivative control action is used alone

53. While testing a system by Routh-Hurwitz criterion, if the first column has a zero in the last row, then the stability can be determined by using.....

(A) ε-technic

(B) Auxiliary equation

(C) both (A) and (B)

(D) Neither (A) nor (B)

54. If k represents the open loop gain, then as k approaches infinity, the root loci approaches toward.....

(A) Open-loop zeros

(B) Open-loop poles

(C) Break away points

(D) jω-axis

55. Given a badly underdamped control system, what type of cascade compensator can be used to improve its damping ?

(A) Phase-lead

(B) Phase lag

(C) Phase-lag-lead

(D) Notch filter

56. The phase angle of a transfer function $(1 + j\omega\tau)^N$ at the corner frequency is.....

(A) 90° N

(B) 45° N

(C) –90° N

(D) – 45° N

57. The maximum value of phase lead for which a single stage cascade lead-compensator should be designed is.....

(A) 180°

(B) 90°

(C) 65°

(D) 135°

58. Is it possible to obtain the closed loop frequency response of a control system from its Nyquist plot ?

(A) Yes

(B) No

(C) Sometimes yes, sometimes no

(D) Nyquist plot itself is the closed-loop frequency response

59. The state space representation of a given control system is.....

(A) Unique

(B) Not unique

(C) Sometimes unique, sometimes not unique

(D) Unique for a given mathematical model

60. In the state space representation of a given control system the number of state variables is.....

(A) Fixed

(B) Not fixed

(C) Depends on the order of the system

(D) Both (A) and (C)

61. What was the estimated per capita income in H.P. at current prices during 2016-17 fiscal (in rupees) ?

(A) 77826 (B) 82329

(C) 94731 (D) 103870

62. Hydro power projects of upto what generation capacity have been reserved in H.P. for the investors belonging to the state ?

(A) 2 MW (B) 4 MW

(C) 5 MW (D) 8 MW

63. How much money will the Government of India contribute towards the construction of Renukaji Dam ?

(A) 75% (B) 80%

(C) 85% (D) 90%

64. Which one among the following districts of H.P. is not included in the scheme relating to formation/promotion of farmer/producer organisations ?

(A) Shimla (B) Una

(C) Kangra (D) Bilaspur

65. As of now, what percentage of Gross state domestic product comes from agriculture and allied sectors in H.P. ?

(A) 5 percent (B) 7 percent

(C) 10 percent (D) 15 percent

66. How much assistance is provided per farmer by the Government in H.P. for construction of vermi pits to promote organic farming ?

(A) ₹ 2000 (B) ₹ 3000

(C) ₹ 5000 (D) ₹ 6000

67. At which place in Una district of H.P. a state of Art industrial area is being set up ?

(A) Amb (B) Nehrian

(C) Gagret (D) Pandoga

68. Out of 14 silk yarn reeling units that have been set up in H.P. in the private sector, how many are in Solan district ?

(A) Three (B) Two

(C) One (D) Nil

69. What is the generation capacity of New Nogli hydropower project ?

(A) 9 MW (B) 12 MW

(C) 15 MW (D) 18 MW

70. How many bonafide Himachali students are given Rashtriya Indian Military College Scholarship of classes 8th to 12th ?

(A) Five (B) Ten

(C) Fifteen (D) Twenty

71. How many seats did the BJP win in Rajasthan during the 2018 Assembly elections ?

(A) 69 (B) 73

(C) 76 (D) 78

72. Which day is observed in India as Naturopathy Day ?

(A) October 18 (B) September 18

(C) November 18 (D) December 18

73. How many gold medals has Mary Kom won in World Boxing Championships so far (upto 2018) ?

(A) Three (B) Four

(C) Five (D) Six

74. Whose ideas are contained in the book titled, Loktantra Ke Swar (in Hindi) ?

(A) Yogendra Yadav (B) Ram Nath Kovind

(C) Yashwant Sinha (D) Venkaiah Naidu

75. Water from which stream gushed into the rate-hole coal mine in East Jaintia (in Meghalaya) where 15 miners were trapped in December 2018 ?

(A) Gamol (B) Simsang

(C) Lytein (D) Manda

76. Which agency withdrew 'Ambassador of Conscience' Award from Aung Suu Kyi on the issue of atrocities on Rohingyas ?

(A) UNO

(B) World Human Rights Organisation

(C) Nobel Prize Committee

(D) Amnesty International

77. To which country does Nadia Murad, who shared the 2018 Nobel Prize for peace, belong ?

(A) Iran

(B) Iraq

(C) Afghanistan

(D) Kuwait

78. Where did President Lincoln give his famous address at the end of American civil war in 1863 ?

(A) Washington

(B) Montgomery

(C) Boston

(D) Gettysburg

79. Which one of the following is NOT considered as a part of Baltic States ?

(A) Belarus

(B) Latvia

(C) Estonia

(D) Lithuania

80. Where is the Headquarter (Secretariat) of the Common Wealth ?

(A) Glasgow

(B) Leeds

(C) Manchester

(D) London

81. Total installed capacity of generation of electric power in Indian is about.....

(A) 196 GW
(B) 346 GW
(C) 1000 GW
(D) 100 GW

82. Total installed capacity of hydroelectric power generation in India is about.....

(A) 50 MW
(B) 196 MW
(C) 500 MW
(D) 50 GW.

83. The insulation resistance of a cable.....with the increase in its length.

(A) Decreases
(B) Increases
(C) Remains unchanged
(D) None of these

84. A material produces a magnetic field which opposes the applied magnetic field, then it is.....

(A) Diamagnetic
(B) Paramagnetic
(C) Electromagnetic
(D) Ferromagnetic

85. When its temperature is decreased, the resistance of carbon filament lamp.....

(A) Increased
(B) Decreased
(C) Remains same
(D) Increases enormously

86. A capacitor of 0.1 μF charged to 120 V is connected across an uncharged capacitor of 0.1 μF. Then the voltage across each capacitor will be.....

(A) 120 V
(B) 60 V
(C) 90 V
(D) 12 V

87. Two electric lamps of 40 W, 200 V each are connected in series and a potential difference of 200 V is applied across them, the power consumed by the combination will be.....

(A) 20 W
(B) 60 W
(C) 80 W
(D) 100 W

88. An incandescent lamp is rated at 100 W, 230 V. What will be its resistance when measured with the help of a multi-meter ?

(A) 529 Ω
(B) 5 Ω
(C) Zero
(D) infinite

89. If impedance is given by Z = (8 + j 6) ohms, what will be its conductance ?

(A) $\frac{1}{8}$ mho
(B) $\frac{1}{10}$ mho
(C) 0.08 mho
(D) 0.06 mho

90. A current of (3 + j 4) amp. flows through a resistance of 10 Ω. What will be the real power consumed ?

(A) 90 W
(B) 160 W
(C) 250 W
(D) 490 W

91. Condition/(s) for superposition principle to be applicable is/(are).....

(A) Linearity
(B) Homogeneity
(C) Both (A) and (B)
(D) None of these

92. In three-phase power measurement by two wattmeter method, the reading of one of the wattmeters was zero. The power factor of the load must be.....

(A) 1
(B) 0.8
(C) 0.5
(D) zero

93. ADC series motor should always be started with load because.....

(A) At no load it will rotate with dangerously high speed
(B) At no load will not develop high starting torque
(C) It cannot start without load
(D) It draws a small amount of current at no load.

94. If the full load iron loss of a transformer is 100 W, what will be its iron loss at half load ?

(A) 100 W
(B) 200 W
(C) 25 W
(D) 400 W

95. A salient pole synchronous motor is running at no load. Its field current is switched off. The motor will.....

(A) Come to stop

(B) Continue to run at synchronous speed

(C) Continue to run at a speed slightly more than the synchronous speed

(D) Continue to run at a speed slightly less than the synchronous speed

96. In a capacitor-start capacitor-run single-phase induction motor the two capacitors.....

(A) have similar construction

(B) are of different types

(C) have equal capacitances

(D) are disconnected when motor attains full speed

97. The motor used in ceiling fan is.....

(A) Split phase motor (B) Capacitor start motor

(C) Shaded pole motor (D) AC series motor

98. For a load flow solution the quantities normally specified at a voltage controlled bus are.....

(A) P and Q (B) P and $|V|$

(C) Q and $|V|$ (D) P and δ

99. Mho relay is normally used for the protection of.....

(A) Long transmission lines (B) Medium transmission lines

(C) Short transmission lines (D) Transformers

100. SF_6 gas has excellent heat transfer properties because of its.....

(A) Higher molecular weight (B) Low gaseous viscosity

(C) Higher dielectric strength (D) both (A) and (B)